
CAPSTONE PROJECT

PROJECT TITLE

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OUTLINE

- Problem Statement
- Proposed System/Solution
- System Development Approach
- Model & Deployment
- Result (Output Image)
- Conclusion
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PROBLEM STATEMENT

- To develop an Agentic AI Health Symptom Checker that helps users understand their health conditions by analyzing symptoms and providing probable causes, preventive advice, and care recommendations. It retrieves verified medical data, symptom databases, and guidelines from trusted sources like WHO, government health portals, and medical journals.
- The agent delivers reliable information by strictly grounding its responses in factual data and clearly stated assumptions. It avoids speculation or self-prediction, instead relying on thorough analysis from multiple trusted sources to ensure accuracy. This approach minimizes misinformation and prevents unwarranted diagnoses or conclusions.

PROPOSED SOLUTION

- The system aims to predict potential health issues based on user symptoms using advanced AI reasoning. It combines IBM Granite-3-3-8b, ReAct , LangGraph with real-time web search tools like Google, DuckDuckGo, and Wikipedia for accurate, up-to-date results.
- Defining the goal:
 - Defining the goal of the ai agent , by providing the instruction to the agent.
 - Define the outcome , sensitivity and reliability of the agent.
- Models and tools:
 - Select the appropriate model for the agent to understand and interact with user in natural language.
 - Select the required tools to search informations from trusted resources and region based output.
- AI Reasoning System :
 - ReAct is used as the reasoning engine of the agent which is responsible for reasoning and agent actions
 - LangGraph is used to control the flow of the agent by managing the memory and state of the agent
- Deployment:
 - The agent is deployed in the IBM cloud environment and can be accessed using the endpoint URL
 - Build a simple web interface for symptoms input and AI output using the IBM agent AI
 - Ensure fast response and scalable backend.
- Evaluation:
 - Measure accuracy, speed, and user satisfaction.
 - Continuously improve based on user feedback and updated data.

SYSTEM APPROACH

- This project uses IBM Granite-3-3-8b to process natural language and analyze user symptoms and suggest possible health issues through real-time AI reasoning and web search integration and uses LangGraph to provide results.
- **System requirements**
 - CPU & 4Gb Ram as virtual resources
 - Watson.ai studio and Watson.ai runtime environment for development
 - IBM granite model for natural language processing
 - ReAct and langGraph models for control flow and reasoning of agent
 - IBM cloud services for deployment
- **Library required to build the model**
 - Transformers , torch ,accelerate , torchvision for model handling
 - LangChain or haystack for agentic logic
 - GoogleSearch – python , Wikipedia for information retrieval
 - Flask, request for API and scraping
 - Pandas , numpy for data handling

MODEL & DEPLOYMENT

- **Model Selection:**
 - The system uses **IBM Granite-3-3-8b**, a large language model specialized in **natural language processing (NLP)**. It's selected for its strong contextual understanding, reasoning abilities, and capacity to process complex symptom descriptions in conversational form.
- **Data Input:**
 - Inputs include natural language - symptom descriptions from users such as "I've sore throat and running nose for past 2 days ". The user prompts the symptoms in the natural language and follow up questions .
- **Instructing the role of agent:**
 - By clearly defining the agent's role and enabling it to process data effectively, it can analyze user-reported symptoms to deliver more accurate results. This promotes early detection, minimizes misinformation, and empowers users to make informed health decisions.
- **Prediction Process:**
 - The model processes input symptoms, queries external sources from google , Wikipedia , web scraping in real time, and generates likely condition suggestions with supporting explanations. Its predictions adapt dynamically based on the live information retrieved during the session.
- **Deployment :**
 - The agent has been thoroughly tested and successfully deployed in the IBM Cloud environment using the Watson.ai runtime service.
 - It is globally accessible via a dedicated endpoint URL and can be seamlessly integrated into other projects and platforms.

RESULT

The screenshot shows the IBM watsonx Agent Lab interface. The top navigation bar includes the IBM watsonx logo, an 'Upgrade' button, a help icon, a notification bell, and the user's account 'RAJ MOHAMED's Account' with a location dropdown set to 'Dallas'. The breadcrumb trail indicates the current path: 'Projects / final_project(symptoms) / Agent Lab'. The main interface is divided into two sections: 'Build' on the left and 'Agent preview' on the right.

Build Section:

- Setup:** Includes 'LangGraph' for the Framework and 'ReAct' for the Architecture.
- Configuration:** Contains 'Instructions' and 'Advanced configuration' links. The instructions text reads: "you are symptoms analysis agent , as an agent help users understand their health conditions by analyzing symptoms and providing probable causes, preventive advice, and care recommendations ,retrieve verified medical data, symptom databases, and guidelines from trusted sources like WHO, government health portals, and medical journals."
- Knowledge:** A section for adding knowledge.
- Tools:** Includes buttons for 'Add a tool' and 'Create custom tool'.

Agent preview Section:

The chat history shows a user input: "i am 25 years old and i have frequent urination and severe head ache". The watsonx Agent responds at 05:01 PM, stating it understands the symptoms and provides a list of four possibilities:

- 1. Diabetes:** Frequent urination is a common symptom of both type 1 and type 2 diabetes. Severe headaches can also occur due to fluctuations in blood sugar levels.
- 2. Kidney Stones:** This condition can cause severe pain in the back or side, along with frequent urination.
- 3. Migraines:** These can cause severe headaches and in some cases, can precede urination due to dehydration (some migraine sufferers urinate more frequently before an attack).
- 4. Urinary Tract Infection (UTI):** Frequent urination is a common symptom.

This screenshot shows the 'Agent preview' section of the IBM watsonx Agent Lab. It provides detailed medical advice based on the symptoms described in the previous screenshot.

Urgency Level: Given the symptoms, it's crucial to seek medical attention soon. While some conditions like dehydration can be managed at home, others like diabetes or kidney stones require immediate medical intervention.

Home Remedies: For headaches, ensure you're staying hydrated. For frequent urination, keep track of your fluid intake to avoid over- or under-hydration.

When to Consult a Doctor: You should consult a doctor immediately, especially if:

- Headaches are accompanied by vision changes, nausea, or confusion.
- Frequent urination leads to dehydration (signs include dark urine, dry mouth, extreme thirst, and fatigue).
- You notice blood in your urine.
- Symptoms persist for more than a few days.

Please remember, while I strive to provide accurate health information, I'm an AI tool and not a doctor. Self-diagnosis can be risky, so it's always best to consult with a healthcare professional for any health concerns.

How did I get this answer?

At the bottom, there is a text input field with the placeholder "Type something..." and a send button.

The screenshot shows the IBM watsonx Deployment spaces interface. The top navigation bar is consistent with the previous screenshots. The breadcrumb trail is 'Deployment spaces /'. The main heading is 'symptoms_deployment_1'. Below this, there are tabs for 'Overview', 'Assets', 'Deployments' (which is active), 'Jobs', and 'Manage'.

Under the 'Deployments' tab, there is a table listing the deployment details:

Name	Type	Status	Asset	Asset type	Tags	Last modified
watsonx Agent	Online	Deployed	watsonx Agent	AI service	wx-agent	36 seconds ago RAJ MOHAMED (You)

This screenshot shows the IBM watsonx Agent interface. The top navigation bar is consistent. The breadcrumb trail is 'Deployment spaces / symptoms_deployment_1 / watsonx Agent'. The status 'Deployed' and 'Online' are shown next to the agent name.

Below the agent name, there are tabs for 'API reference', 'Test', and 'Preview' (which is active). A 'New chat +' button is located at the top right of the chat area.

The chat history shows a user input at 12:33 AM: "i have mild fever and sore throat". The watsonx Agent responds at 12:33 AM, stating it has some possibilities based on the symptoms:

- 1. Common Cold:** This is a viral infection that typically causes a mild fever, sore throat, and other symptoms like a runny nose, cough, and congestion.
- 2. Influenza (Flu):** This is a viral infection that can also cause fever, sore throat, and other symptoms like body aches, fatigue, and cough.
- 3. Strep Throat:** This is a bacterial infection that can cause a high fever, severe sore throat, and other symptoms like swollen

At the bottom, there is a text input field with the placeholder "Type something..." and a send button.

CONCLUSION

- The agentic AI system proved effective in processing diverse health-related inputs, maintaining secure data handling, and delivering accurate, multilingual guidance. Its design aligns with ethical and educational principles, reinforcing trust in digital health interactions. In medical fields, this agent can assist in preliminary symptom assessment, support telemedicine workflows, and aid underserved communities with language-specific health literacy tools. Its consistency, transparency, and adaptability establish it as a valuable enhancement to modern healthcare systems, especially in early-stage patient engagement and information access.

FUTURE SCOPE

- Incorporate adaptive learning models that evolve based on user feedback and interactions to improve symptom detection accuracy.
- **Expand the medical database by including up-to-date clinical guidelines, regional health trends, and localized disease patterns to boost reliability and relevance**
- **Strengthen multilingual support and cultural adaptability to ensure broader inclusivity and reach.**
- **Integrate advanced personalization features, such as tracking user health history and preferences, to deliver tailored and meaningful healthcare responses.**
- **Promote interoperability with other healthcare systems and APIs, allowing the symptom checker to serve as a modular component within broader health tech ecosystems.**

REFERENCES

- [Agentic AI Architecture – IBM](#)
Explains how agentic systems autonomously plan and execute tasks using LLMs, orchestration, and tool integration.
- [Granite Product Guide – IBM](#)
Details IBM's suite of enterprise-grade generative AI models, including language, code, and time-series variants.
- [Watsonx.ai Product Page – IBM](#)
Describes the AI studio for building, training, and deploying foundation models.
- [Isabel Symptom Checker](#)
A professional-grade tool used by hospitals for accurate symptom analysis.
- [Agentic AI Health Symptom Checker – GitHub Project](#)
A working example using IBM Watsonx.ai and Granite models to analyze symptoms and provide guidance.

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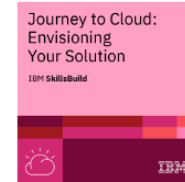
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This certificate is presented to

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for the completion of

Lab: Retrieval Augmented Generation with LangChain

(ALM-COURSE_3824998)

According to the Adobe Learning Manager system of record

Completion date: 24 Jul 2025 (GMT)

Learning hours: 20 mins



THANK YOU